Tomorrow's offices through today's eyes: Effects of innovation in the working environment

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ABSTRACT

Many organisations have changed to new ways of working, steered or followed up by design interventions and sharing of activity-related workplaces. Expectations have been high. Innovative offices should lead to more efficient use of space and other facilities; greater job satisfaction; the projection of a positive image to clients; an improved performance of the organisation and its staff; and reduced costs. Have innovations in the working environment fulfilled these high expectations? Are the new offices really more efficient and more pleasant to work in? Or will constant changing of the workplace reduce satisfaction and productivity? What are the 'pros' and 'cons' of teleworking? Are the extra costs of nice ergonomic furniture, high-tech information and communication technology (ICT) and image-boosting gadgets counterbalanced by the expected profits in higher productivity and more efficient use of space? Evaluative research results show a mixed picture. Besides the considerable satisfaction with the attractive design and the improved opportunities to interact, there are many complaints about problems in concentrating on work. Psychological mechanisms, such as the need for status, privacy and individual territory,

do not necessarily hinder 'flexi-working', but only when the new situation provides considerable added value. Teleworking offers more freedom of choice, but there are attendant risks.

Modern society is very dynamic. The media are full of reports on flexibility, globalisation, digitalisation and e-commerce. Profit and nonprofit organisations are investing substantially in new technology, such as Internet and digital subscription lines (xDSL); in the near future they will also be investing in broadband. Fast, powerful, small and mobile resources are making the importance of time and place quite relative. People can work just as well at home, at the client's, or under way. They do not have to congregate in one building to be productive. Virtually operating project teams are being set up in many organisations. Work processes are getting a facelift. Staff members work at the time and in the place that best suits them, if, that is, as long as the final results agreed to are achieved.

Management leaves the 'how' and 'where' more and more to the staff members themselves. In the race to recruit increasingly scarce, highly qualified personnel, autonomy, trust and responsibility are important work benefits. Office workers seem to be seeking, specifically, an interesting, exciting and creative existence, where work and private life fit in well with each other. If it were up to management or shareholders, in the future work would proceed more quickly, still better and everywhere.

These developments make great demands on the work environment.

According to visionary consultants and architects, isolated little rooms and musty, cellular offices have no place in the network society. Innovative offices with sexy names like 'non-territorial' office, 'club office' and 'fun office' are better suited to modern 'knowledge workers'. Because, increasingly, office workers do not — or do not have to — put in an appearance at the office, the occupation rate drops. The efficient handling of space and facilities requires the sharing of workplaces. The central office is increasingly assuming the character of a meeting place, and this demands a great degree of open space, and cosy corners. These factors act as a stimulant to interaction, consultation and creative group processes. This is why various organisations have chosen to undergo a process of change in order to attune accommodation, ICT and other facilities to changing work processes; this is a development called, in short, 'workplace innovation'.[2] Since workplace innovation began in the Netherlands, the Department of Real Estate & Project Management of the Delft University of Technology — in collaboration with the Dutch Government Buildings Agency, and later with the ABN AMRO Bank — has researched this phenomenon; a line of development which, enriched with the expertise of other organisations, has been continued in the recently established Centre for People and Buildings. The focal point is the question of the optimal match between accommodation and facilities on the one hand, and organisations and work processes on the other, and this in interaction with an environment in which all sorts of societal, economic and technological developments are taking place. In this paper, the authors briefly characterise workplace innovation, some experiences with it in practice and its possible implications for the future.
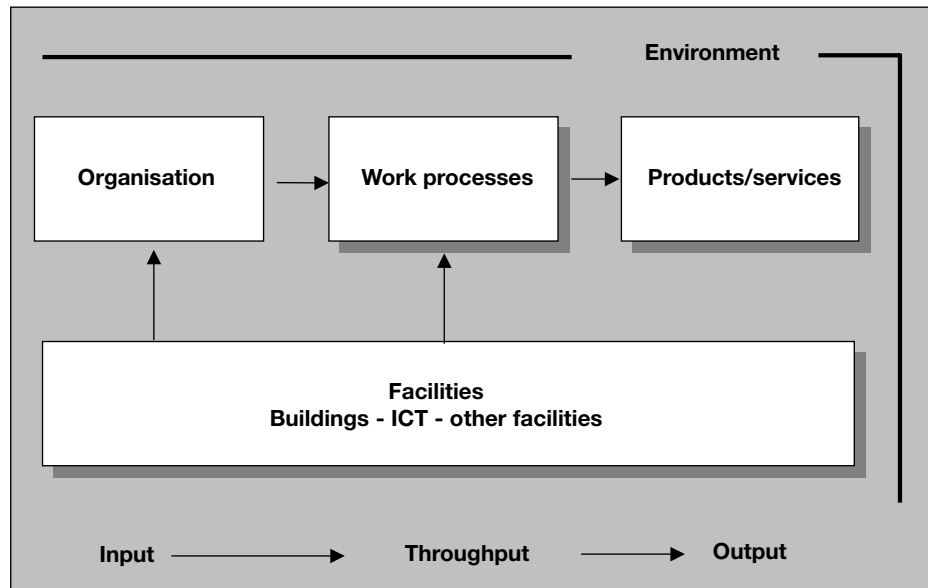
WORKPLACE INNOVATION INVESTIGATED

The way in which workplace innovation is carried out can vary considerably, but many of the ingredients are very similar. They include the following:

— Rebuilding a cellular office environment or an open-plan office as a combi office: enclosed workplaces at the front of the building for individual or duo use and concentrated work, around an open central area for group work, meetings and common facilities
— Introducing 'flexi-working' with shared workplaces (desk sharing: use of one workplace by more people); interchangeable workplaces (desk rotating: workplaces that are not designated to one person); and activity-related workplaces (varied supply of workplaces designated to various tasks)

— Attractively designed and ergonomically responsible furniture: for instance, height-adjustable or otherwise adjustable worktops and chairs
— Advanced information and communication technology (ICT), such as powerful and mobile computers (laptops), mobile phones, intranet and Internet
— A different filing system (central, digital)
— Distance working — at home, at the client's or under way — either digitally connected with the central office or not; often several part-days per week; sometimes in a continuous period when working together on a project in a satellite office (teleworking office for staff of the same organisation) or hotel office (teleworking office where several organisations can rent space and facilities).

These ingredients can be summed up as

changes in location (from the home office to workplaces at a distance); in layout (from a closed to an open structure, and all sorts of combinations); and in the use of workplaces (from a personally designated workplace to a non-territorial workplace).[3]

The expectations have been high. Through workplace innovation, organisations hope to be better tuned to changing work processes, to achieve a higher degree of employees' job satisfaction, and to achieve higher work productivity and considerable savings in costs.[4] Often, one of the conditions made prior to innovation is that the well-being of the workers remains at least the same. Other aims are the encouragement of change (the work environment as catalyst for a change of culture, increased dynamics, greater flexibility of organisation and staff); gaining experience with new technologies (for instance, experiments with cordless working); or fulfilling the function of setting an example (for instance, government, which wishes to reduce automobile use through teleworking).

The objectives of workplace innovation can be distinguished at three levels: society (macro), the organisation (meso) and the individual employee (micro).[5] Macro objectives have a view to the better functioning of the society as a whole: a cleaner environment achieved through a reduction in the use of the number of square metres of space, or the reduction of commuter traffic by building at work locations and stimulating telework. Macro objectives are formulated chiefly by public (government) organisations. Meso objectives have to do with the interests of the organisation: for instance, reduction in costs through the sharing of workplaces, or production improvement through working more efficiently. Micro objectives are directed towards the individual interests of office

workers: for instance, increased job satisfaction through an attractive working environment. One complicating factor is that objectives often originate from more than one level. It is then important to realise that different priorities and objectives are ascribed from each of the three levels. The interests can complement each other, and then synergy is created. Thus an attractively decorated and healthy working environment will not only have a favourable effect on the contentment of staff members, but also be perceptible in improved production results and reduced sick leave. Interests can also conflict: a virtually classic example is that of savings in costs through the use of fewer square metres versus work satisfaction. If employees are more cramped, and have to surrender their fixed workplaces, this always results initially in dissatisfaction. It is then of primary importance that management sets clear priorities in its objectives.

The degrees to which the more important objectives of workplace innovation have been achieved are set out in the next section.
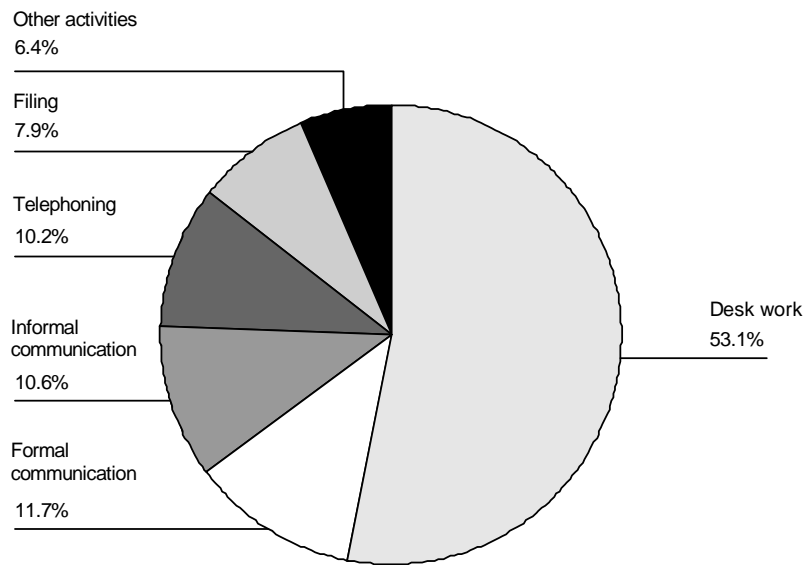
DOES IT WORK BETTER?

Activity-related work in a combi office

The *combi office* was developed as an appropriate workplace concept for workers with a varied pattern of tasks. An office worker is, on average, engaged approximately half the time in computer and reading work, and the other half in meetings, dialogues and filing.[6]

The thought behind the combi office, or cocoon office, is that a differentiated set of tasks calls for differentiated 'activity-related' workplaces: places suited to communication, formal and informal consultation, concentration, briefly mailing

Figure 2 Division
of office activities
by time

Other activities
6.4%

Filing
7.9%

Telephoning
10.2%

Informal
communication
10.6%

Formal
communication
11.7%

Desk work
53.1%

Source: Vos, P. G. J. C. (1997–99) 'Werkt het beter in het Dynamischkantoor Haarlem?' [Does it work better in Dynamic Office Haarlem?], Department of Real Estate & Project Management, Faculty of Architecture, Delft University of Technology.

something, etc. The work is done in the place best suited to it. Regular change of workplace (desk rotating) is usually coupled with the sharing of workplaces (desk sharing). Except for some large-scale projects at Interpolis NV, the Taxation Department, The Dutch Government Buildings Agency and the ABN AMRO Bank, the combi office is mainly being tried out in small-scale experiments. The experiences are varied. Open workplaces are experienced positively, because of the encouragement to communicate and the enhanced feeling of space. Increase and decrease in the number of staff, and internal moves, are easier to handle because of the greater degree of flexibility. Weighed against these benefits is the fact that quite a few people complain of a lack of privacy (visual, acoustic, territorial) and find it difficult to concentrate.[7] Concentration cells are often small and

cramped and insufficiently isolated acoustically. There are also psychological barriers, such as a feeling of being cooped up; lack of ways to control things oneself; and visual stress.

Because of the wide central areas and the transparent set-up, many combi offices look like busy newspaper offices where stressed-out people are engaged in feverish activity. It seems to be very important to investigate accurately which work the users actually do; how it is distributed over time; whether workers are at the office full-time or only very irregularly; and what spatial consequences these factors have.

Innovative projects have not seldom failed because design decisions had been made on the basis of wrong assumptions. To be sure, it looks very up to date if staff spend a lot of time with the client, brainstorm creatively, and work together

in multidisciplinary teams, but when this is not the case, and when they are for the greater part of the time alone at the computer or reading paperwork, a cellular office is a better option than an open flexi-layout. Bad timing (people are not ready for it) and an insufficiently thought-out implementation process can also harm the project considerably.

Flexi-work

The experiences with flexi-working at the Ministry of Economic Affairs,[8] the 'Dynamischkantoor Haarlem'[9] and ABN AMRO bank[10] illustrate that, in the new situation, workers consciously seek each other out more frequently. They communicate more with each other on an *ad hoc* basis. The experience of Interpolis NV confirms a strengthening in internal communication.[11] Though it is difficult to determine whether work is being discussed, increased communication is, in any case, good for the atmosphere and group feeling. One negative effect of flexi-working is that people lose more time on the planning and organisation of activities, such as looking up information and putting away documents. This applies particularly to leaving the workplace clean (clean desking) and the storage of personal effects in a mobile chest of drawers (trolleys). Because flexi-workers do not possess a permanent workplace with their own storage space, they have to be very conscious of the sort of work they want to do on a particular day, and which things they will need to do it. Quite a number of flexi-workers lack this overview. Other minus points are the loss of time through the regular adjustment of furniture, and logging-in again. The fear of its being more difficult to reach colleagues has proved unfounded. Because of the innovative office's enhanced transparency, keeping track of who is sitting where, and the improved telephonic accessibility (person-dedicated instead of place-dedicated telephones) has in fact made it easier for people to reach each other.

What is noteworthy is that flexi-workers finally adjust without making too many problems about having to give up a set workplace. After stiff opposition in the initiation phase, afterwards, in the use phase, there are few complaints. On the basis of current theories from environmental psychology more opposition would be expected. Think of the need for status, privacy, identity, personal control and personal territory.[12] The proverbial photo of the 'home front' (a hobbyhorse of the opposition to workplace innovation) is evidently more of a romanticised image that refers to times past than something that really concerns staff members. For that matter, in the old situation, there was often no photo on the desk, and its possible lack is easily compensated for by installing the photo as a screensaver.

It has to be said, though, that if people get the chance, they will almost always immediately seize their own spot again. This happens especially when there are plenty of workplaces and flexi-work is not strictly necessary. Even when there is a scarcity of workplaces, flexi-workers still often try to claim their own spot. Many people have a favourite spot: for instance, because of the view, protected back, because it is quiet (at the end of a corridor) or close to colleagues they like. Just as people at the beach claim their spot by spreading out beach towels and putting up a wind screen, flexi-workers start with dropping their papers and other possessions at their favourite spot. This 'fixed flexi-working' has been noted in various case studies.

In some functions, flexi-working does not seem to be a good alternative. In a pilot study at a research department of the Delft University of Technology, flexi-

Figure 3 Perceived productivity after the move to a flexible working environment

Productivity
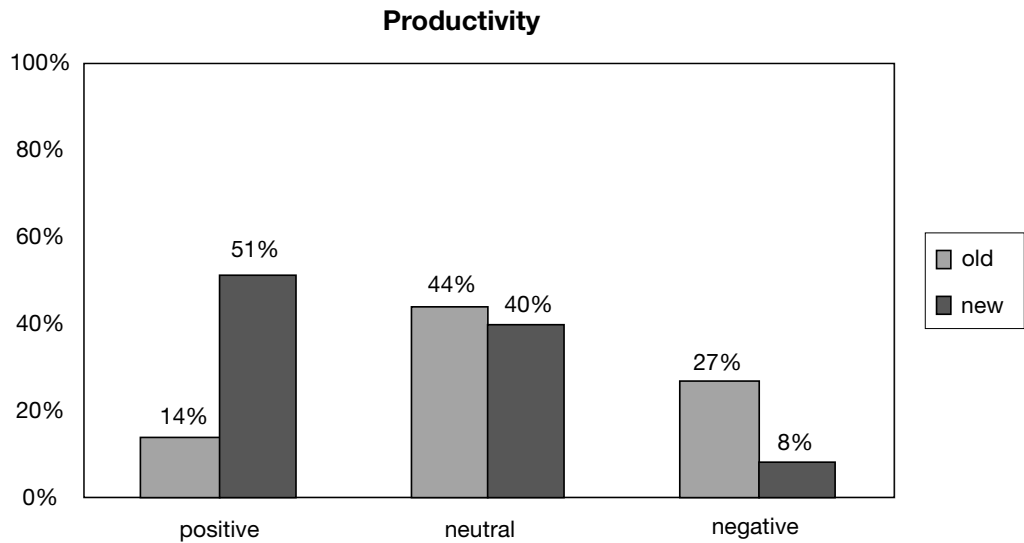
Source: Van den Brink, A., (2000) one of the researched cases, in: 'De effecten in kaart' [Effects of Flexible Offices], ABN AMRO Bank BV and BMVB, Faculty of Architecture, Delft University of Technology.

working proved to be non-discussible, both for practical reasons (nearly everyone there works full-time and staff are fairly constantly present) and for psychological reasons ('in research, one needs one's own space to hatch new ideas, and a book case').[13] At KPN Telecom's legal department, an innovative plan was reversed because the lawyers emphatically claimed to need their own room because of the many confidential discussions.

In a flexi-work situation, managers have to get used to exercising a different kind of control. When staff are very mobile and have more freedom in carrying out their tasks, control has to be exercised differently: from control of staff presence to output-oriented control. Many managers cannot or will not do this. One thorny problem is that the output of a knowledge worker is difficult to measure; Interpolis NV has solved it by setting targets for everyone and in all

functions. The targets can vary, from closing 100 policy agreements per week to rounding off a project on a due date. However, not every function lends itself to a quantitative evaluation of output.

Although the productivity of staff is difficult to measure, there is the impression that this is influenced by flexi-working rather more positively than it is negatively. Internal moves are more easily managed, without interference to the surroundings and the concomitant inconvenience. There are no signs of increased sick leave.

The staff's own estimation of the effect on their productivity is often moderately positive. Flexi-working demands working more strictly to programme. The improved communication enhances the exchange of information, expertise and skills. The possibility of being able to work with full concentration is a major point that demands attention. Advanced information and communication technol-

ogy increases efficiency if it is supported by an adequate help desk. The compatibility of hardware and software and the ability to make a rapid response to complaints and problems are major preconditions.

Telework

Experiments with *distance working* have demonstrated that workers can concentrate better at home.[14] There is less interruption at home than there is at the office; thus, people think that they can deliver their product better and more quickly. Other advantages in this situation are: the worker's greater autonomy (the worker can organise his/her own time; there are no clothing regulations); it is easier to combine work and private life (eg, care tasks; being home for a repair man without having to take time off); reduction in sick leave (eg, working on with a sport injury); saving in travelling time; and — especially important from an environmental viewpoint — reducing traffic congestion (less home–work traffic less overburdening of the traffic infrastructure through, for example, first answering the mail at home and then going to work only after the peak hour).

There are, however, also disadvantages. Work and private life tend to overlap to such a degree that people have the feeling that they are never free. Many teleworkers have difficulty in combining work and private life in an adequate and healthy way. From recent research by TNO Arbeid (TNO is the Netherlands' central organisation for Applied Scientific Research), it has been shown that home workers put in many more hours than their colleagues do.[15] Easily three-quarters of teleworkers who work more than half the time at home put in an average of seven hours overtime per week. This increases the risk of stress. At the organisation's central office, those colleagues left behind often experience an increase in work demand, brought about by taking telephone calls, doing rush jobs and solving all sorts of problems that would normally be solved by the absent colleagues.

Informal contact with colleagues is no longer a matter of course, and because of this, much valuable information is not satisfactorily received, or is received too late. Communication is chiefly via the telephone, the mail, or e-mail, instead of face to face. People miss the 'corridors' and the coffee corner where, even (or especially) in the digital age, much is discussed and decided. Gentronics is an example of an experiment with working at home that was terminated ahead of time because colleagues missed each other too much. In addition to the need for conviviality, the issue here was also that the development of software is teamwork. Even the newest technology cannot completely bridge the physical distance between workers. Home workers therefore run the risk of losing social contacts and the bond with the organisation itself. To compensate for this, more information is supplied (eg by electronic memos). Often, a limit is set on teleworking (eg not more than two days per week), time blocks are introduced, and the traditional monthly drink and the yearly sailing party with the workers' partners are added to by devising creative solutions to the problem. One example of this is that of the Inspectie Milieuhygiëne Regio Oost (Environmental Health Inspection, Eastern Region), where teleworkers, in the interests of regular contact and of strengthening the team spirit, regularly as a group put in some work on an 'adopted' area of forest.

The experience with teleworking in office buildings furnished specifically for this purpose is varied. Telework centres in Almere, Tilburg and Utrecht have proved

to be less successful than expected.[16] A *telework collective office* in Purmerend had to close its doors after three years (1992–1995). Teleworkers would rather keep on working at home, in their familiar surroundings, than in a telework office in their neighbourhood. A poll of staff at the Department of Public Works confirmed this scenario: more than three-quarters indicated that they preferred a workplace at home to a satellite office or local office. Two experiments by the Dutch Government Buildings Agency with *satellite offices* in Arnhem and in 'Dynamischkantoor Haarlem' were, in time, given up. Insufficient insight into the users' needs and a negative balance between costs and benefits (limited time gain through less distance to travel) are the explanatory factors here.

Another project of the Dutch Government Buildings Agency, the hotel office 'Bleijenburg' in the Hague, was, however, a great success.[17] Positive factors were the favourable location (close to other government buildings, thus suited to solve temporary lack of space); the user-friendly work environment (an historic building with modern interior); and a wide range of supporting facilities (luxurious furniture, high-quality ICT, all sorts of convenience services). Because the building received a different designation, the experiment ended after three years. Because of Bleijenburg's success, the Dutch Government Buildings Agency is looking for another suitable building. The Regus office hotels, Mulbees' work cafés, D-Office's hotel offices and the Business Corners in AC Restaurants are all examples of successful market initiatives.

Partly because of the disadvantages, teleworking has not reached the heights predicted by the supporters of this innovative way of working. It is true that figures show that, in Europe, the Netherlands is in the lead, but there are still no more than 140,000 registered teleworkers.[18] It is remarkable that even in the 'new economy' businesses in the ICT sector, teleworking is not a matter of course, and it is doubtful whether in the near future one should expect a swing towards teleworking. The technology to be able to work differently has, after all, already been available for a long time.

Often, teleworking is limited to extending the working day: in the morning, first reading some e-mail; on the way home and in the evening, doing some more work; knocking off a couple of hours earlier and making up the work at the weekend. Work times then become more fluid (boundaries between work and private life become vague), more extended and more fragmented (no longer nine-to-five).

IS IT CHEAPER?

Driven by the economic crises of the 1980s, an increasing number of organisations were compelled to seek ways to reduce operating costs. Saving space and reducing housing costs became aims in themselves. The sharing of working space — whether or not combined with teleworking — was seen by many organisations as a major means of cutting costs. Numbers of workplaces; total floor areas; building materials; energy demands; maintenance costs; and rent or depreciation will all be reduced. Organisations can also achieve lower internal moving costs, through a more flexible layout, and lower travelling costs, through teleworking. They can further look forward to improving the balance between cost and production, as follows:

— Catalyst for innovation (more flexible, more creative, more dynamic);
— Higher degree of work satisfaction

through free choice and autonomy, high-quality layout and design and improved health and well-being;

— Higher work productivity (working more efficiently and effectively); better transfers of communication and information; better telephonic and electronic accessibility; enhanced problem-solving ability for the organisation as a whole and for individual employees; more flexible disposition of staff; less sick leave;

— Attracting and retaining scarce highly qualified staff;

— Attracting and retaining clients (positive image; closer to the clients; better accessibility; better service; quicker trajectory between thinking up products or services and getting them onto the market).

Erik Veldhoen, trend-setter in the field of workplace innovation, writes in 'The Demise of the Office' about savings in floor space that can amount to as much as 50 per cent and savings on the total facility that can reach 40 per cent.[19] Croon, on the basis of case studies at Interpolis NV and Andersen Consulting, even talks about possible cost reductions of 62 per cent per employee, depending on the rental rate of space in the office building.[20]

Heijink calculated for the Ministry of Transport and Public Works that, through the introduction of flexi-working in combination with longer opening hours, a 36-hour working week and one or two days per week teleworking, it would be possible to scrap 10 per cent (137) of the total number of workplaces.[21] Assuming an average of NLG 25,000 per workplace per year, this is a saving of NLG 3.4m. By combining six departments of the Ministry for Housing, Physical Planning and Environment in the 'Dynamischkantoor Haarlem', and the application of flexi

workplaces, there was a saving of 20 per cent on the usual arrangement of space.[22] The application of a similar concept at the director's offices of the Ministry of Internal Affairs and the Ministry of Economic Affairs resulted in a space saving of 36 per cent.[23] Precise figures on the cost reduction achieved are not known. At Interpolis NV, the combination of teleworking and flexi-working made, at that time, building a second office tower unnecessary. This meant a cost reduction of NLG 35m. Nevertheless, because of the organisation's rapid growth, work was begun on the tower in early 1999.

Weighed against these substantial reductions in space and cost, there are considerable additional costs generated by office innovation. Some likely categories are listed below:

— Structural rebuilding or alteration costs;

— Finishing and layout: attractive and ergonomically responsible furniture; flexible walls, floors, ceilings; more support spots (coffee corners, clubs, seating);

— Advanced ICT: including mobile phones, laptops, Internet and intranet, central/digital filing system;

— Adaptation and installation of equipment;

— Rental and equipment of external workplaces: teleworking; home working; flexible workplaces in office hotel or satellite office;

— Implementation costs for advisers, meetings and workshops; pilot with trial layout, product development, training in a new way of working;

— Extra office management for, among other things, reservation and allocation of flexible workplaces and supervision of central filing system;

— Extra cleaning costs connected with

extensive glass and intensive use of flexible workplaces.

The user-friendly, ergonomically designed furniture is generally more expensive than that used in traditional office plans. The supporting ICT and other equipment, and also the architectural adaptations necessary to realise innovative planning concepts, are similarly very expensive. According to the Dutch Government Buildings Agency, the furnishing costs of an innovative office are approximately 75 per cent higher than the furnishing costs of a traditional office.[24] Part of the savings is thus often used to enable the implementation of the qualitatively superior concept. In KPN Vastgoed's (Royal Dutch Post and Telecom Company) innovative office, close to the total saving of 15 per cent went on the new outfitting. In addition, the time-consuming design and implementation process, the further indirect expenses of more complex management (regulation of workplace allocation, extra cleaning costs) and the rental and outfitting costs of external workplaces raise costs. According to Troost, at a rental rate of NLG 240 per square metre rentable floor space, a space reduction of at least 24 per cent is necessary to compensate for the extra investment.

Recent research at the Delft University of Technology shows that, on balance, the investment costs per employee sometimes turn out to be tens of per cents higher in an innovative office.[25] The exploitation costs per employee, however, are often lower than in traditional offices (savings of approximately 10–20 per cent). The additional costs and the reduced costs, both in total as per cost item, appear to vary significantly per project. The major causes of the wide spread in cost reductions are due to a large number of variables, such as the potentially realisable space reduction; the rental price; the projected quality level of the outfitting; the terms of amortisation; and (assumptions regarding) development and implementation costs, service costs and transaction costs.

HIGHER JOB SATISFACTION?

A new concept is almost always accompanied by advanced ICT, new furnishings and a central filing system, digitised or not. There is mainly a positive evaluation of the possibilities that these facilities provide for the user. Roomy desks, comfortable chairs and attractive, fresh colours contribute substantially to a positive evaluation of innovative workplaces. Individually adjustable furniture (desktop, chair) is, however, not always used as intended. Staff do not always take the trouble to make the right adjustments. People find it annoying and a waste of time and not everybody knows how to do it. There is a clear need for instruction on the desirable (health and safety) height. Translation of health and safety legislation into the home situation has yet to cut its teeth.

Minus points that give rise to much irritation are lockers that are too small and trolleys or flexi-cases for personal files that are too heavy; and technical breakdowns, laborious procedures for the use of a help desk, etc. Properly functioning ICT has proved to be crucial to successful office innovation. Just after delivery, in particular, there is often annoyance about a network that is not adequately flexible, compatibility problems caused by the application of differing hardware and software, unequal user possibilities (a fully equipped computer at the permanent workplace or at the flexi-workplace, but not in concentration cells and team space), time-consuming PC logging-in procedures, and technical disruptions. Many people find protracted use of a laptop unpleasant. A PC or a dock-
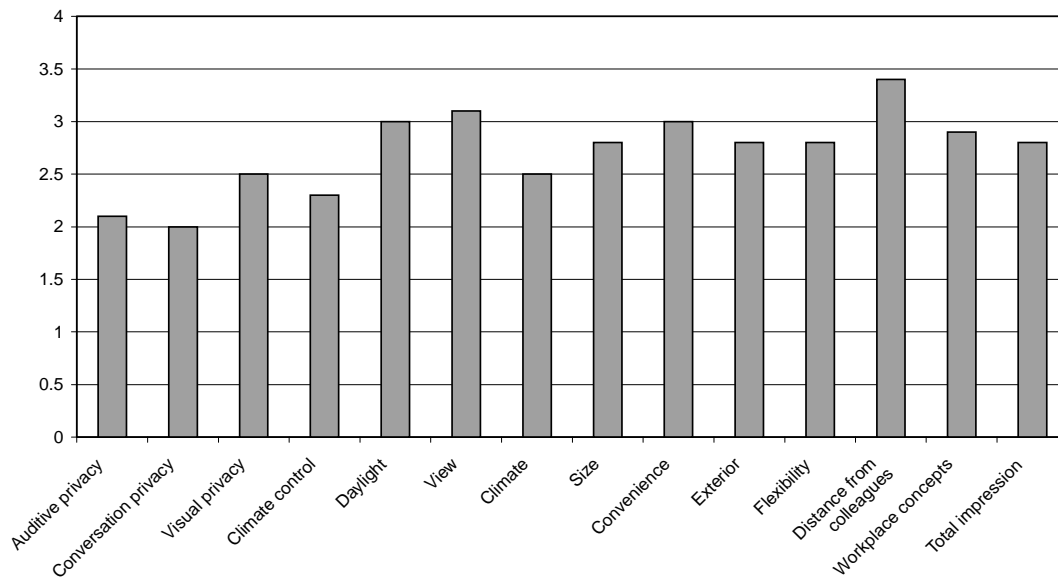
Figure 4   Increase
in job satisfaction in
a researched case

Source: Vos, P. G. J. C. (1997–1999) 'Werkt het beter in het Dynamischkantoor Haarlem?' [Does it work better in Dynamic Office Haarlem?], Department of Real Estate & Project Management, Faculty of Architecture, Delft University of Technology.

ing station is preferred by application developers and programmers.

Central filing can provide considerable savings in the volume of filing space. There are, though, often starting problems, such as insufficient access to the data and an unclear ordering of information. However, it is found that after a familiarisation period there is often less time lost in looking for and filing documents. The use of glass partitions considerably reduces the space available for placing cupboards. It was noted also that in some places there was not enough filing space. It is important that the common filing system does not come at the bottom of the list, but that from the very beginning it is included as a point of attention. This applies likewise to the storage of journals and the arrangement of the departmental library. Information, training and the introduction of a document management system are important

tools in creating a successful filing system.

CONCLUSIONS

Partly thanks to the attractive interior design and advanced facilities (IT, attractive supporting facilities), the evaluation of workplace innovation has, on balance, been favourable in many projects. Although most users estimate that little has changed in their productivity, a majority finds that innovative work and layout concepts fit in well with their work. They do not wish to return to the old type of cellular office (separate rooms). The high perception value, advanced equipment, pride in being one of those at the forefront, and sometimes also not wanting to face the bother of new changes in the office concept and being tired of change, seem to be the most plausible explanations. As a user of the 'Dynamischkantoor

Figure 5 Total impression of flexible working environments in a researched case
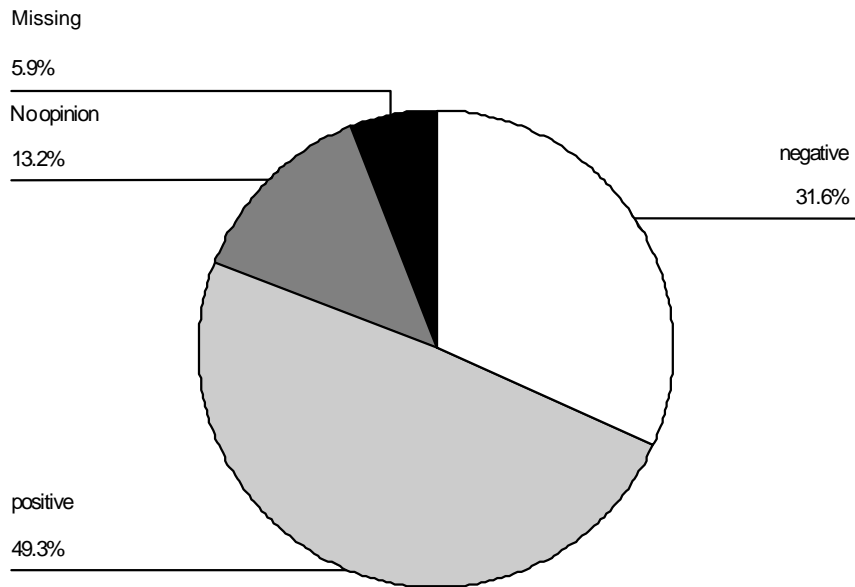
Haarlem' put it: 'There are indeed complaints about the building, but that doesn't take away from the fact that we're quite proud of what's happening here.'

In spite of the positive experiences, and the predictions of workplace gurus that the traditional office will rapidly disappear, the great breakthrough of the combi office has still not come about. Teleworking, combi offices and flexible workplaces are still not common in the Netherlands. Only 10–15 per cent of all office organisations have (part of) the office laid out on innovative lines. This percentage is slowly growing. The most important reasons for this seem to be the necessarily high investment, fear of negative effects and disinclination toward the complex process of implementation and management. Several objectives of workplace innovation are difficult to combine. The desire for more communication is often at odds with the need for concentration and

privacy. The desire for cost reduction is at odds with the necessity for a wide variety of types of workplaces, luxurious and ergonomically designed furniture and advanced ICT.

The sharing of workplaces is contrary to the deep-rooted need for one's own clearly recognisable spot. Further, workplace innovation is not equally attractive to, or worth while for, all professional groups. For workers who spend much time at the office, especially those whose work requires a lot of concentration or who carry on a lot of confidential discussions, the familiar, personal work room is still a valid concept, if in a more modern style and with powerful ICT.

To sum up, the following conclusions on workplace innovation can be arrived at:

— Teleworking at home often leads to

working in a more concentrated way and to more freedom of choice in the allocation of time and way of working. However, there is the threat of a decline in contact with colleagues at the home office; a limited bond with the organisation; and an increased workload for the colleagues at the home office.

— The application of a combi office, flexi-workplaces and activity-related workplaces leads, in general, to more and better communication, but also to problems with concentration on work (visual distraction, noise nuisance) and to complaints of lack of privacy.

— Through the application of flexi-workplaces, available space can be used more efficiently. Depending on the number of employees that share a workplace, and the number of square metres per workplace, reductions of some tens of percentage points are possible. The savings in costs are proportional. Against this, there are considerable additional costs because of the user-friendly furnishing, advanced facilities, the more complex design and implementation process, and the more complex management of innovative workplaces.

— In spite of negative side effects, in many projects the majority of users indicated they would not want to go back to a more traditional office set-up.

— The most positive aspects of office innovation for its users are: more freedom in the choice of workplace, the increased possibility of communication, the application of advanced technological aids and the luxurious surroundings.

— The most negative aspects for the users are: loss of concentration, less privacy, a feeling of pressure ('stimulus overload') and sometimes also a feeling of

being constricted.

— The 'risks' of workplace innovation can be traced chiefly to insufficiently addressing universal human needs, such as privacy, identity, status and personal control.

LESSONS LEARNED

The variety of partly ambivalent experiences shows that no blueprint can be given for the best office of the future. The ultimate choice concerning place, space and use of workplaces must, above all, be tuned to the type of organisation, the office culture and the style of management, to the nature of the activities and to the physical, social and psychological needs of the employees. A sound inquiry into organisational characteristics and activity patterns is a necessary precondition for successful innovation. Probably the application of different concepts is the optimal solution. Workplace innovation in an existing building requires also a careful examination of the building and its potential for change. Careful execution of the plan is equally and highly important. A wrong estimate of the number of flexi-workplaces, a poor sound isolation in the concentration cells, or problems with ICT may lead to many complaints, even if a concept in itself fits well with the organisation and the working processes.

To make the right choices a lot of research is needed. Many questions remain. Can indicators be developed for the relationship between the number of workers and the number of flexi-workplaces, for the implementation costs per employee, and for number of square metres of rentable floor space per workplace? What is the optimal size of a concentration cell? What is the telework optimum, for the organisation

and for the individual? Therefore it is extremely important for organisations to document information about housing processes and how the working environment is experienced by the users. Only then are they likely to succeed in building a 'body of knowledge' about workplace concepts that exceeds the quality levels of anecdotal success-stories.

Apart from a good product, a carefully carried-out implementation process is a critical factor. The clear communication of 'how' and 'why', an enthusiastic pioneering role on the part of management, good follow-up and good maintenance are all factors in achieving success.

The following recommendations have been distilled from involvement in innovation projects:

— First chart the organisation and the work processes. Useful instruments are users' questionnaires, interviews with key personnel and time monitoring of occupation rates at representative times.
— Organise a start-up meeting to inform all involved organisation members as to basic assumptions and aims, the approach to the process and the anticipated final result. Be clear about the preconditions (square metres norms, budget, the existing building).
— Ensure a project organisation with clearly defined tasks and authority of those involved, and ensure clear procedures.
— Ensure there is a balance between steering from a clear policy position ('top down') and development on the basis of users' ideas ('bottom up').
— Organise workshops with the users, to gain insight into desired and expected changes in the organisation, work processed, ICT and housing.

— Tune the number of workshops to the need for information and discussion, efficient use of time and a reasonable length of time for the project (indication: 3–5 workshops).
— Organise, in a fairly early phase, an excursion to innovative work environments (seeing is believing).
— Involve the architect early in the process, so that work processes and trends are clear and the first contours of the desired workplace concepts start to be discernible.
— Come to clear agreements on the use and management of the new accommodation; provide training for the users so that they will make good use of the new accommodation.

TOMORROW'S OFFICE?

The combi office seems to be the golden mean between the traditional cellular office and the open-plan office. Once, the cellular office was the answer to the criticism of industrial offices as being similar to 'white-collar factories' in a Taylorian work style. Office employees in cellular offices have a fixed workplace in a one-person room or a room shared by several people, with the allocation of space and furnishing appropriate to their status.

Because of the need for more flexibility, and influenced by the wave of democracy, the open-plan office was introduced in the 1960s. This open concept was to lead to more interaction, better communication, more egalitarian accommodation for everyone, and to easier adjustment to increases and decreases in staff. Lack of privacy, nuisance from noise, physical discomfort (dry throat, burning eyes, headaches) and not enough opportunity personally to influence the working environment (not being able to regulate the central heating oneself, non-opening

windows) are the reasons for this type of office not being very popular. A compromise was found in the group office and, later, the combi office. Under the influence of powerful and mobile ICT facilities, nowadays people are able to work where and whenever they want. So 'the office is where you are', either teleworking or flexi-working through the common use of activity-regulated workplaces.

The latest developments point in the direction of completely virtually operating network organisations that have only an interestingly furnished habitat for meetings and for sport and games (fun offices). Trend-setters thus predict that the office will disappear and will make place for 'network accommodation': a collection of accommodation solutions varying from central office to tele-workplace. After all, modern ICT makes it possible to work where (and when) one wants: 'the office is where you are'. It is thought that the office could undergo a transformation into a 'club' (a name that refers to the (old) traditional gentlemen's associations), a meeting place with places for project groups, team discussions and brainstorming sessions. An example of this is The Vision Web, a network organisation with 500 consultants, ICT specialists and marketers. The entire virtual network (there is no office) meets and confers in 'grand cafés'. Multi-user touchdown offices also seem — judging by the success of the Regus offices, Mullbees and D-Office — to be looking forward to a bright future.

However, concurrently, there are counter-forces that cause developments to move less rapidly than some had expected. Because of the need for formal and informal contact, people want to keep on meeting each other face to face. Even many hip dot.com organisations do not dare to go in wholesale for teleworking.

Psychological mechanisms such as the need for sufficient space, privacy, and one's own fixed place as expressions of identity and status are firmly rooted. This probably explains why the vast majority of offices in the Netherlands are still laid out according to the cellular office plan. Many organisations expect that the situation will not be very different in the future. However, all this does not rule out the fact that modern adaptations can be made in the form of ICT, furniture and other fittings, without there being a drastic intrusion into the existing concept and layout. There is something to say for both ideas: steadily progressing office innovation versus keeping to more traditional concepts, but in a modern style.

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